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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/817,339

03/27/2001

Yoshihiro Hama

P20338

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11/07/2005

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EXAMINER

PHAM, HAI CHI

ART UNIT

PAPER NUMBER

2861

DATE MAILED: 11/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/817,339

Applicant(s)

HAMA ET AL.

Examiner

Hai C. Pham

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2861

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 August 2005.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 and 15-17 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-12 and 15-17 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

FINAL REJECTION

Claim Objections

1. Claims 1, 3 are objected to because of the following informalities:

Claim 1:

- Line 11, "reflective" (first occurrence) should read --reflection-- to keep the claimed terminologies consistent with what was originally listed, i.e., "reflection surface" at line 16,
- Line 11, "reflective" (second occurrence) should read --reflection--,
- Line 12, "reflective" should read --reflection--,
- Line 13, "reflective" should read --reflection--.

Claim 3:

- Line 2, "a first reflection surface" should read --said first reflection surface-- since the limitation has been recited in the parent claim 1.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made."

3. Claims 1-3, 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Andrews (U.S. 5,757,413) in view of Koide (U.S. 5,181,137).

Andrews discloses a multi-beam scanning device comprising a light source emitting a plurality of light beams (light generating device 34 emitting four laser beams 46, 48, 50, 52), a single polygon mirror (18, Fig. 5), an optical system that converges the deflected light beams on a plurality of objects to be scanned (photoreceptors 24, 26, 28, 30), the plurality of objects being arranged on a side, with respect to said polygon mirror, in which said light beams scan (the four photoreceptors being disposed on one side of the polygon mirror), said optical system including a plurality of optical path turning systems that turn optical paths of the deflected light beams (e.g., as shown in Fig. 5), each of said optical path turning systems comprising a first reflection surface, the first reflection surface of each of said optical path turning systems being separate from the first reflection surface of every other optical path turning system, each of said first reflection surfaces being positioned along a direction in which the light beams are deflected by the polygon mirror (the respective first mirrors 86, 90, 92, 94 are distinct from each other and are disposed along the direction of the deflected light beams), optical path lengths of the optical paths being substantially the same (col. 5, lines 15-27), and all of said optical path turning systems including an even number of reflection surfaces (each set of mirrors for the respective four laser beams having an even number, e.g., either two or four reflecting mirrors) such that each of the deflected laser beams are reflected an even number of times. Andrews further teaches an f- θ lens (20) including a first lens, a second lens, and a third lens (Fig. 2).

Andrews fails to teach the four photoreceptors being arranged from a position closer to the polygon mirror to a position farther from the polygon mirror (claim 1), the four photoreceptors being arranged in a plane parallel to the deflected light beams (claim 16), and the third f- θ lens comprising a plurality of third f- θ lenses arranged after the optical path turning systems (claims 2-3):

Koide, an acknowledged prior art, discloses a light scanning apparatus for scanning a multiple photoreceptors (50-53) disposed on one side of the single polygon mirror (2) and located at different distances from the polygon mirror, the system including a light source emitting a plurality of light beams, which are deflected by the common rotating polygon mirror, all the deflected plural light beams passing through a common pair of f- θ lenses (3a and 3b) before being reflected by the respective sets of reflecting mirrors of an equal number (130-133), wherein each of the reflected light beam passes through a respective third lens (40-43) to be focused on the surface of the respective photoreceptors, an wherein the image plane at the respective photoreceptors is parallel to the respective deflected light beam (Fig. 4).

It would also have been obvious at the time the invention was made to a person having ordinary skill in the art to rearrange to image planes or photoreceptors in the device of Andrews as taught by Koide since such a modification would have involved a mere change in the position of components, which would not have modified the operation of the device. A change of position is generally recognized as being within the level of ordinary skill in the art. In re Kuhle, 526 F.2d 553, 188 USPQ 7 (CCPA 1975).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to rearrange the third focusing lens system in the device of Andrews after the respective sets of optical path turning systems as taught by Koide. The motivation for doing so would have been to correct the bending as well as the focusing of the scan lines on the respective image planes as suggested by Koide.

4. Claims 1 and 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang (U.S. 6,219,168) in view of Andrews.

Wang discloses in Figure 7 a raster output scanning system (330) for scanning a multiple photoreceptors (340, 346, 352 and 358) disposed on one side of the single polygon mirror (300) and arranged in a plane parallel to the deflected beams from a position closer to the polygon mirror to a position farther from the polygon mirror, the system including a light source emitting a plurality of light beams, which are deflected by the common rotating polygon mirror, and a plurality of optical path turning systems that turn optical paths of the deflected light beams, each having an even and same number of reflecting mirrors (respective pairs of mirrors 336-338, 342-344, 348-350 and 354-356), wherein the first reflection surface (e.g., mirror 336) of each system is distinct from each of the other sets (e.g., mirror 342, 348 or 354) and are positioned along a direction in which the light beams are deflected by the polygon mirror.

Wang fails to teach the optical path lengths of the optical paths being equal to each other.

Andrews teaches a multi-beam scanning device comprising a light generating device (34) emitting four laser beams (46, 48, 50, 52), a single polygon mirror (18), an optical system that converges the deflected light beams on a plurality of photoreceptors (24, 26, 28, 30), which are arranged on a side with respect to said polygon mirror, and a plurality of optical path turning systems that turn optical paths of the deflected light beams, each of said optical path turning systems comprising a first reflection surface (first mirrors 86, 90, 92, 94), which is distinct from the first reflection surface of every other optical path turning system, and positioned along a direction in which the light beams are deflected by the polygon mirror, wherein the optical path lengths of the optical paths being are substantially the same (col. 5, lines 15-27).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to set the optical path in the device of Wang to equal length as taught by Andrews. The motivation for doing so would have been to obtain similar dimensioned spots at each of the photoreceptors and to reduce problems in registration.

5. Claims 4-5 and 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Andrews in view of Koide, as applied to claims 1-3 above, and further in view of Sekikawa (U.S. 6,304,360).

Andrews, as modified by Koide, discloses all the basic limitations of the claimed invention except for the one of the optical paths having a third optical path passing between the polygon mirror and the first lens, the third optical path intersecting the first

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optical path, and the beam proceeding along the second optical path being directed on an opposite side with respect to the first optical path.

Sekikawa discloses an optical scanning device having a single polygon mirror (26) for deflecting plural light beams to scan the respective photosensitive drums (38A-D), a plurality of optical path turning systems that turn optical paths of the deflected light beams, each comprising an even and equal number of reflection surfaces, whose first reflection surfaces are distinct from each other, wherein at least one of the optical paths having a third optical path passing between the polygon mirror and the first lens (Fig. 2), each of the third optical path intersecting the first optical path, and wherein each of the beam proceeding along the second optical path being directed on an opposite side with respect to the first optical path.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the device of Andrews with the aforementioned teachings of Sekikawa. The motivation for doing so would have been to provide a more compact configuration of the optical scanning system at a low cost and small size and with high performance as suggested by Sekikawa.

With regard to claim 7, Andrews teaches the optical path turning systems comprising a dichroic prism having a reflecting surface to a specific wavelength (dichroic prism 86, 90, 92 or 94) and a corresponding mirror having a reflection surface.

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6. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Andrews in view of Koide, as applied to claims 1-4 above, and further in view of Maruyama (U.S. 6,346,957).

Andrews, as modified by Koide, discloses all the basic limitations of the claimed invention except for at least one of the optical path turning systems including a prism having two reflection surfaces.

Maruyama discloses a multi-beam scanning device comprising optical path turning systems, which include a prism (32) having two reflection surfaces (Fig. 2C).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate a prism having two reflection surfaces in the device of Andrews as taught by Maruyama. The motivation for doing so would have been to provide a low cost and small size device by further minimizing the number of components.

7. Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Andrews in view of Koide, as applied to claims 1-4 above, and further in view of Kamikubo (U.S. 6,115,164).

Andrews, as modified by Koide, discloses all the basic limitations of the claimed invention except for the refractive power characteristics of the f- θ lenses.

Kamikubo discloses a scanning optical system in which the f- θ lenses include a first imaging lens (21), a second imaging lens (22) and a third imaging lens (30), wherein the first and the second imaging lenses have positive power in the main

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scanning direction while the third imaging lens has a strong positive power in the auxiliary scanning direction such that the balance of the refractive power of the imaging lenses as a whole is maintained (col. 4, lines 40-62).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate the set of imaging lenses of the modified device of Andrews having the refractive power characteristics as taught by Kamikubo such that the light beam passing through the set of imaging lenses is properly converged in both the main and auxiliary scanning directions to form a beam spot on the surface to be scanned.

Response to Arguments

8. Applicant's arguments with respect to claims 1-12 and 15-17 have been considered but are moot in view of the new grounds of rejection as presented in this Office action.

In response to applicant's argument that there is no suggestion to combine the references since "the arrangements of the mirrors in the different inventions are completely different", the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Koide and

Wang, for examples, each displays several embodiments wherein the arrangements of the mirrors as well as the configurations of the photoreceptors with respect to the single polygon mirror can be modified to adapt for the number of various components forming the optical scanning apparatus. It has been held that the provision of adjustability, where needed, involves only routine skill in the art. In re Stevens, 101 USPQ 284 (CCPA 1954).

Conclusion

9. Applicant's amendment, which changed the scope of the independent claim 1, necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai C. Pham whose telephone number is (571) 272-2260. The examiner can normally be reached on M-F 8:30AM - 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L. Talbott can be reached on (571) 272-1934. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



HAI PHAM
PRIMARY EXAMINER
November 2, 2005